

IN THE SPECIFICATION

Please amend paragraphs [0066], [0092], [0106] and [0107] of Applicants' published specification as follows:

[0066] Multiplier 113 multiplies the Nyquist signal of Bit1, 3 input to frequency-increasing SSB modulator 110 by a cosine curve, from frequency signal source 112, with frequency $\omega_1 - \omega_0/2$ obtained by subtracting a half the symbol frequency ω_0 [[co]] from carrier frequency ω_1 . At the same time, multiplier 114 multiplies a signal obtained by passing the Nyquist signal of Bit1, 3 through Hilbert transformer 111 by a sine curve with the frequency $\omega_1 - \omega_0/2$ from frequency signal source 112. Adder 115 calculates the sum of these two outputs, and an upper SSB signal (USB signal) is obtained which conveys the signal Bit1, 3 and has the carrier frequency $\omega_1 - \omega_0/2$.

[0092] Frequency-decreasing demodulator 310 has a demodulator comprised of frequency signal source 313 and multiplier 311. Frequency-decreasing demodulator 310 multiplies in multiplier 311 the input signal by a cosine curve, from frequency signal source 313, with the frequency $\omega_1 - \omega_0/2$ $\omega_1 - \omega_0/2$ obtained by subtracting a half the symbol frequency ω_0 from the carrier frequency ω_1 . Passing the output through Nyquist filter (NFL) 330 obtains the original signal Bit1, 2.

[0106] Thus, in this Embodiment, the configuration is adopted where first and second frequency-increasing SSB modulators 110 and 120 are provided, carrier frequencies in SSB modulators 110 and 120 are provided with a difference by a frequency corresponding to the reciprocal of the symbol frequency rate (i.e. fundamental frequency of the input symbol), the LSB

signal is obtained from SSB modulator 120 set for a higher carrier frequency, while the USB signal is obtained from SSB modulator 110 set for a lower carrier frequency, and the sum of the LSB signal and USB output is the modulation output. Thus, by performing the SSB scheme on the I-axis signal and Q-axis signal, the bandwidth of each side band is expanded to bandwidth BW1 of original both sides that is two times the original side band (FIG. 4C), SSB modulation is performed by using a carrier frequency higher than a carrier frequency used in forming the USB signal by the fundamental frequency of an input symbol in forming the LSB signal, it is thus possible to multiplex the LSB signal and USB signal in the same frequencies (FIG. 4D), and a modulation signal can be obtained with a double transmission rate enabled and a given frequency bandwidth not changed. As a result, it is possible to implement modulation apparatus 100 capable of achieving a double transmission rate of the signal transmission rate of the conventional quadrature modulation scheme in a range of the frequency bandwidth required for the conventional quadrature modulation scheme.

[0107] Further, first and second frequency-decreasing SSB demodulators 310 and 320 are provided, the carrier frequency in the SSB demodulator 310 is provided with a difference by a frequency corresponding to the reciprocal of the symbol frequency rate (i.e. fundamental frequency of the transmission symbol), the LSB signal is obtained from the demodulator 320 set for a higher carrier frequency, while the USB signal is obtained from the demodulator 310 set for a lower carrier frequency, and it is thereby possible to implement the demodulation apparatus capable of extracting the USB signal and LSB signal from a received signal comprised of quadrature-multiplexed USB signal and LSB signal.